

QUALITY OF AGRICULTURAL DRAINAGE DISCHARGING  
TO THE SAN JOAQUIN RIVER AND DELTA FROM  
THE EASTERN PORTION OF CONTRA COSTA COUNTY, CALIFORNIA  
DECEMBER 1985 TO SEPTEMBER 1987

California Regional Water Quality Control Board  
Central Valley Region  
3443 Routier Road  
Sacramento, CA 95827-3098

May 1989

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

Board Members

Paul E. Simpson, Chair  
Clifford C. Wisdom, Vice Chair  
Karen Vercruse  
John S. Corkins  
Hugh V. Johns  
W. Steve Tompkins  
W. M. "Walt" Winn

William H. Crooks, Executive Officer

The staff involved in the  
preparation of this report are:

D.W. Westcot, Senior Land and Water Use Analyst  
L.F. Pratt, Associate Land and Water Use Analyst  
K.K. Belden, Geology Assistant

## TABLE OF CONTENTS

|                        | <u>Page</u> |
|------------------------|-------------|
| INTRODUCTION . . . . . | 1           |
| STUDY AREA . . . . .   | 1           |
| METHODS . . . . .      | 3           |
| RESULTS . . . . .      | 4           |
| REFERENCES . . . . .   | 5           |
| APPENDIX A . . . . .   | 11          |

## LIST OF TABLES

|                                                                                                                                                                              | <u>Page</u> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Table 1      Subsurface Drainage Flow Monitoring Sites<br>In Eastern Contra Costa County . . . . .                                                                           | 3           |
| Table 2      Summary of Constituent Concentration Ranges<br>From Discharges That Flow Into the San Joaquin River<br>and the Delta From Eastern Contra Costa County . . . . . | 5           |
| Table 3      Water Quality Data For Sites Monitored in<br>Contra Costa County . . . . .                                                                                      | 6           |

## LIST OF FIGURES

|                                                                                           |   |
|-------------------------------------------------------------------------------------------|---|
| Figure 1      Location of Contra Costa County Water Quality<br>Monitoring Sites . . . . . | 2 |
|-------------------------------------------------------------------------------------------|---|

## INTRODUCTION

The Agricultural Unit of the Central Valley Regional Water Quality Control Board (Regional Board) initiated a water quality monitoring program in December 1985 to evaluate the effects of subsurface agricultural drainage water discharges from eastern Contra Costa County on the Western Delta Sloughs and the San Joaquin River water quality. The study area is the agricultural land located on the western side of the San Joaquin River within eastern Contra Costa County (Figure 1). The purpose of this monitoring program was to compile a data base for selected inorganic constituents found in the agricultural drains that are discharging into the Delta and the San Joaquin River. This data base will be used in the development and evaluation of the need for an agricultural drainage reduction program.

The majority of the subsurface agricultural drainage pollutant load is discharge to the San Joaquin River via Mud Slough (north) and Salt Slough in Merced County (James, et al., 1988a and 1988b). The impact of these discharges, however, is highly modified by numerous surface discharges downstream of these two sloughs. The importance of these downstream discharges is manifested by the finding that the majority of the San Joaquin River from the Salt and Mud Sloughs inflow to Vernalis in many months of the year is made up entirely of agricultural return flows.

The San Joaquin River is thus highly modified by the time it reaches the Delta. The river is further modified in the Delta by localized extractions and discharges. The main influences on San Joaquin River flow in the Delta are the U.S. Bureau of Reclamation and State Water Project extraction pumps located near Tracy. The majority of the river flow returns to these pumps. The quality of San Joaquin River is influenced also by localized subsurface drainage water discharges upstream and downstream of the project extraction pumps. Little information is available on the quality and magnitude of these localized discharges.

The most significant discharges occur from the western side of the San Joaquin River in both San Joaquin and eastern Contra Costa County. The objective of this study was to characterize the discharges known to enter the San Joaquin River from the eastern portion of Contra Costa County. The goals were to develop a data base that could be used in assessing beneficial use impairment and whether there is a need for regulatory actions.

## STUDY AREA

The study area consists of the eastern portion of Contra Costa County that drains into the San Joaquin River. Drainage discharges occur throughout the lower section of the river from approximately the Clifton Court Forebay near the San Joaquin County line north to Rock Slough near Veale Tract Island. Major portions of the irrigated land within this area has subsurface drainage. The irrigated lands fall mostly within the East Contra Costa Irrigation District (ECCID) (18,000 acres) and the Byron-Bethany Irrigation District (BBID) (17,200 acres). The subsurface drainage problem occurs throughout the eastern portion of these two districts. The area affected by a high water table is approximately 13,000 acres or about 35 percent of the district service areas. There are three discharge points within the ECCID and six discharge points within BBID. The discharge sites are listed in Table 1. Discharges from these districts flow into Rock Slough and Indian Slough. One drain within the BBID discharges

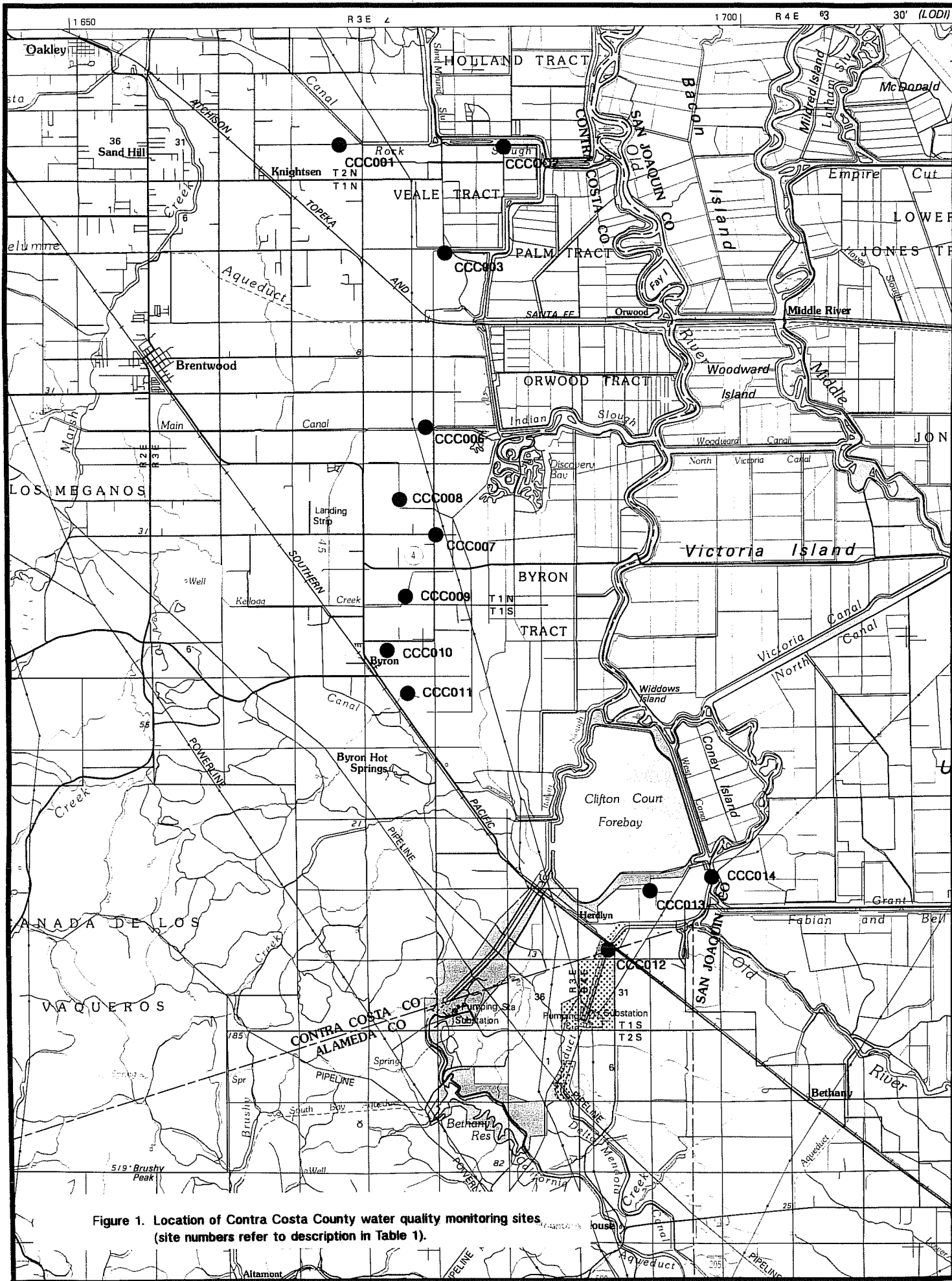


Figure 1. Location of Contra Costa County water quality monitoring sites (site numbers refer to description in Table 1).

directly to the Delta-Mendota Canal. Each of the drains carry only subsurface drainage water as no surface drainage water is permitted into the system. Flow estimates for each of the discharge sites are given in Table 1. Water quality monitoring was conducted on all of these sites as well as three additional discharges that occur outside these district areas. Two of these sites are located adjacent to the Clifton Court Forebay and the third is located on Veale Tract Island. A description of each of the discharge sites is given in Appendix A and shown in Figure 1. The sites monitored during this study carry approximately 90 percent of the subsurface drainage flow from eastern Contra Costa County.

---

Table 1 Subsurface Drainage Flow Monitoring Sites in Eastern Contra Costa County

| <u>SITE #</u> | <u>SITE NAME</u>                        | <u>ESTIMATED ANNUAL FLOW (AC-FT)</u> |
|---------------|-----------------------------------------|--------------------------------------|
| CCC001        | Tule Lane Drain (ECCID)                 | 150                                  |
| CCC002        | Main Drain Pump at Veale Tract          | N/A                                  |
| CCC003        | Richardson Drain (ECCID)                | 1,530                                |
| CCC006        | Stenzel Drain (ECCID)                   | 500-1,000                            |
| CCC007        | Marsh Creek Road Collector Drain (BBID) | 290                                  |
| CCC008        | Mikelson/Coelho Drain (BBID)            | 365                                  |
| CCC009        | Collector Line 4-N, 5-N (BBID)          | 110                                  |
| CCC010        | Collector Drain 6-N (BBID)              | 150                                  |
| CCC011        | Fisk Creek Collector Drain 7-N (BBID)   | N/A                                  |
| CCC012        | Delta Mendota Discharge (BBID)          | 590                                  |
| CCC013        | Sheldon Moore Main Drain Sump           | N/A                                  |
| CCC014        | Sheldon Moore East Drain Sump           | N/A                                  |

(ECCID) East Contra Costa Irrigation District

(BBID) Byron Bethany Irrigation District

---

## METHODS

The study was initiated in December 1985 and periodic sampling was conducted through the end of the 1987 irrigation season (end September 1987). The frequency of sample collection for this monitoring program varied but generally grab samples were collected bi-monthly during the irrigation season. Additional samples were taken at selected times during the nonirrigation season. This sampling frequency was supplemented by sampling at selected sites by the local water districts.

All samples were analyzed for total recoverable selenium, boron, chloride, sulfate, total alkalinity and electrical conductivity (EC). Selected sites during 1986 were tested also for total recoverable copper, chromium, lead, mercury, molybdenum, nickel and zinc. Water temperature, pH, EC, flow and sample time were recorded in the field at each site. All samples were collected in polyethylene bottles. All sample bottles were washed and acid rinsed in the laboratory prior to use and rinsed three times with the water to be sampled prior to sample collection. Selenium and other trace element samples were preserved by lowering the pH to less than 2 using ultra-pure nitric acid fixation techniques. All samples were kept on ice until preservation or submittal to the laboratory.

A quality control and quality assurance program was conducted utilizing spike and duplicate samples in the laboratory. In addition, blind replicate samples were collected at 10 percent of the sites and 50 percent of the blind replicates were spiked for laboratory quality assurance. All reported results fall within quality assurance tolerance guidelines.

## RESULTS

Concentrations of the measured constituents varied between discharge site, time of the year, and between years. Median mineral and selenium concentrations are listed in Table 2 for the sites within both irrigation districts. Two sites (CCC013 and CCC014) near the Clifton Court Forebay were not considered in this analysis as they represented a small area which might be affected by the water project facilities. Water quality for the individual sites and sampling dates are given in Table 3. The median salinity (EC) was 1,720  $\mu\text{mhos/cm}$ . This compares with a median EC of 6,100  $\mu\text{mhos/cm}$  for drains coming from the Panoche Fan Area (Chilcott, et al., 1988). The median boron concentration was 2.8 mg/L as compared to a median of 7.9 mg/L from subsurface drains in the Panoche Fan Area. The median boron concentration is higher than drains found in the Stanislaus County area but approximately equal to those found in the San Joaquin County area (Chilcott, et al., 1988 and Westcot, et al., 1989). Boron has been known as a cropping problem in this area and even though subsurface drains have been in operation in this area for over 20 years, boron concentrations continue to be high.

Trace element concentrations from the monitored sites are low. Median selenium concentrations for samples collected within the two irrigation districts is low. Median total recoverable selenium was 1.6  $\mu\text{g/L}$  which is only slightly higher than the concentration reported by Chilcott, et al., 1988. Although total recoverable selenium varied from 0.2 to 3.4  $\mu\text{g/L}$ , the concentrations did not vary seasonally and likely do not present a concern for beneficial use impairment.

Concentrations of other trace elements (Mo, Cr, Cu, Ni, Pb, Zn, and Hg) are low and continue to follow the general pattern suggested by Chilcott, et al., 1988. Seasonal variability was not notable. The occasional high concentrations encountered were mostly associated with the Main Drain at Veale Tract. This drain collects high ground water on Veale Tract but the collector system is an open drain and surface runoff can enter the drain. The Veale Tract drain also is subject to past land use influences. On several occasions, industrial by-products have been used as soil amendments. The influence of these practices is unknown.

The two subsurface drainage water sumps located on the south side of the Clifton Court Forebay (sites CCC013 and CCC014) have shown variable water quality with concentrations at times much higher than other drains in the eastern Contra Costa County. Concentration also appear to change with the seasons although the data set is insufficient to make a detailed analysis. Both boron and salinity (EC) are higher than at similar time periods for drains within BBID and ECCID. Selenium concentrations are not strongly elevated; however, the one sample taken for trace elements showed elevated levels of molybdenum, copper, nickel, lead, and zinc. The cause of these elevated levels is unknown.

Table 2. Summary of Constituent Concentration Ranges from Discharges That Flow Into the San Joaquin River and Delta From Eastern Contra Costa County

|       | EC       | Se             | Mo | Cu | Cr | Ni | Pb | Zn | Hg      | B            | Cl   |
|-------|----------|----------------|----|----|----|----|----|----|---------|--------------|------|
|       | umhos/cm | .....ug/L..... |    |    |    |    |    |    |         | ....mg/L.... |      |
| Min   | 840      | 0.2            | <5 | <1 | <1 | <5 | <5 | <1 | <0.0002 | 0.55         | 94   |
| Med   | 1720     | 1.6            | <5 | 2  | 3  | <5 | <5 | 1  | <0.5    | 2.8          | 230  |
| Max   | 6400     | 3.4            | 20 | 36 | 19 | 66 | 17 | 42 | 0.82    | 16           | 1400 |
| Count | 107      | 89             | 64 | 64 | 64 | 64 | 64 | 58 | 64      | 106          | 107  |

|       | SO4            | Ca  | Mg  | Na  | K    | CO3 | HCO3 | Total Alk. | Hard. | TDS  | Temp (F) |
|-------|----------------|-----|-----|-----|------|-----|------|------------|-------|------|----------|
|       | .....mg/L..... |     |     |     |      |     |      |            |       |      |          |
| Min   | 47             | 17  | 34  | 2.5 | 0.35 | 0   | 260  | 150        | 180   | 760  | 50       |
| Med   | 180            | 51  | 58  | 200 | 0.93 | 0   | 340  | 360        | 370   | 1100 | 65       |
| Max   | 1200           | 171 | 226 | 918 | 7.7  | 0   | 420  | 470        | 1330  | 4300 | 80       |
| Count | 99             | 43  | 43  | 43  | 43   | 49  | 49   | 84         | 43    | 43   | 101      |

## REFERENCES

- Chilcott, J.E., Westcot, D.W., Werner, K. and Belden, K.K., 1988. Water Quality Survey of Tile Drainage Discharges in the San Joaquin River Basin. Central Valley Regional Water Quality Control Board Report, 65 pages.
- James, E.W., Westcot, D.W., Grewell, B.J., Belden, K.K., Boyd, T.F., Waters, R.I., and Thomasson, R.R., 1988a. Agricultural Drainage Contribution to Water Quality in the Grassland Area of Western Merced County, California. Central Valley Regional Water Quality Control Board Report, 169 pages.
- James, E.W., Grewell, B.J., Westcot, D.W., Belden, K.K. and Boyd, T.F., 1988b. Water Quality of the Lower San Joaquin River: Lander Avenue to Vernalis, May 1985 to March 1988. Central Valley Regional Water Quality Control Board Report, 95 pages.
- Westcot, D.W., James, E.W., Waters, R.I., and Thomasson, R.R., 1989. Quality of Agricultural Drainage Discharging to the San Joaquin River from the Western Portion of Stanislaus County, California. April 1985 to October 1988. Central Valley Regional Water Quality Control Board Report, 122 pages.



Table 3. Water Quality Data for Sites Monitored in Contra Costa County (continued)

| Site Name                      | Date     | Time | field |             | pH   | EC<br>umhos/cm | Se  | Mo  | Cu  | Cr  | Ni  | Pb  | Zn      | Hg   | B    | Cl   | SO4 | Ca  | Mg  | Na  | K   | CO3 | HCO3 | Total |       |      |    |
|--------------------------------|----------|------|-------|-------------|------|----------------|-----|-----|-----|-----|-----|-----|---------|------|------|------|-----|-----|-----|-----|-----|-----|------|-------|-------|------|----|
|                                |          |      | pH    | Temp<br>(F) |      |                |     |     |     |     |     |     |         |      |      |      |     |     |     |     |     |     |      | Alk.  | Hard. | TDS  |    |
| Tule Lane Collector Drain      |          |      |       |             |      |                |     |     |     |     |     |     |         |      |      |      |     |     |     |     |     |     |      |       |       |      |    |
| CCC001                         | 12/12/85 | 0830 | 7.6   |             | 1710 | 2              | <5  | 3.1 | 1.5 | 4.2 | 5.1 | 9   | <0.0002 | 2.0  | 200  | 180  |     |     |     |     |     |     |      |       |       | 62   |    |
| CCC001                         | 01/14/86 | 0910 | 7.4   |             | 1600 | 2              | 7   | 2   | 1   | <5  | <5  |     | <0.5    | 1.9  | 200  | 210  |     |     |     |     |     | 0   | 350  | 358   |       | 61   |    |
| CCC001                         | 02/24/86 | 1045 | 7.8   | 8.2         | 1850 | 3              | <5  | 2.8 | 1.3 | 2.9 | <5  | 42  | <0.2    | 2.1  | 230  | 230  |     | 57  | 79  | 214 | 1.6 | 0   | 350  | 350   | 460   | 1100 | 63 |
| CCC001                         | 03/17/86 | 1315 | 7.4   | 8.2         | 1900 | 3              | 5.4 | 1.8 | 2   | 15  | <5  | <1  | <0.0002 | 2.4  | 240  | 280  |     | 65  | 88  | 216 | 1.5 | 0   | 380  | 380   | 480   | 1100 |    |
| CCC001                         | 04/22/86 | 1000 | 7.5   | 8.0         | 1900 | 2.8            |     |     |     |     |     |     |         | 1.7  | 250  | 250  |     | 88  | 82  | 217 | 1.7 | 0   | 410  | 410   | 480   | 1200 | 63 |
| CCC001                         | 06/13/86 | 0950 | 8.1   |             | 1600 |                |     | <1  | 1   | <5  | <5  | 1   | <0.5    | 4.4  | 140  | 140  |     | 31  | 66  | 160 | 1.6 | 0   | 380  | 380   | 340   | 930  | 65 |
| CCC001                         | 06/23/86 | 1005 | 8.4   |             | 1600 | 1.8            |     |     |     |     |     |     |         | 1.9  | 200  | 200  |     |     |     |     |     |     |      | 360   |       |      |    |
| CCC001                         | 08/25/86 | 1000 |       |             | 1600 | 2.1            | <5  | 1   | 8   | <5  | <5  | <1  | <0.5    | 1.9  | 170  | 172  |     |     |     |     |     |     |      | 410   |       |      | 66 |
| CCC001                         | 10/25/86 | 0920 |       |             | 1200 | 2.2            | <5  | 3   | <1  | <5  | <5  | <1  | <0.5    | 1.7  | 190  | 190  |     |     |     |     |     |     |      | 380   |       |      | 64 |
| CCC001                         | 12/29/86 | 1030 | 7.1   |             | 2000 | 2.8            | <5  | <1  | <1  | <5  | <5  | <1  | <0.5    | 1.8  | 210  | 210  |     |     |     |     |     |     |      |       |       |      |    |
| CCC001                         | 04/08/87 | 1340 | 6.8   |             | 1870 | 2.3            |     |     |     |     |     |     |         | 2.0  | 200  |      |     |     |     |     |     |     |      |       |       |      | 64 |
| CCC001                         | 06/01/87 | 7.7  |       |             | 1620 |                |     |     |     |     |     |     |         | 1.8  | 167  | 155  |     |     |     |     |     |     |      |       |       |      | 65 |
| CCC001                         | 08/03/87 | 1515 | 7.0   |             | 1500 | 1.8            |     |     |     |     |     |     |         | 1.6  | 130  | 140  |     |     |     |     |     |     | 390  |       |       |      | 67 |
| Main Drain Pump at Veale Tract |          |      |       |             |      |                |     |     |     |     |     |     |         |      |      |      |     |     |     |     |     |     |      |       |       |      |    |
| CCC002                         | 03/27/86 | 1140 | 7.4   | 8.2         | 6400 | 1              | 20  | 36  | 2   | 66  | 17  | 16  | <0.5    | 4.9  | 1400 | 1200 |     | 171 | 226 | 918 | 7.7 | 0   | 420  | 420   | 1330  | 4300 | 68 |
| CCC002                         | 04/22/86 | 1030 | 7.6   | 8.0         | 4700 | 0.9            |     |     |     |     |     |     |         | 3.6  | 1300 | 920  |     | 141 | 181 | 720 | 6.3 | 0   | 390  | 390   | 1000  | 3100 | 66 |
| CCC002                         | 06/13/86 | 1020 | 8.2   |             | 2700 |                |     |     |     |     |     |     |         | 2.2  | 540  | 360  |     | 82  | 90  | 360 | 5.1 | 0   | 370  | 370   | 540   | 1700 | 64 |
| CCC002                         | 06/23/86 | 1030 | 8.1   |             | 1500 | 0.3            | <5  | <1  | <1  | <5  | <5  | 2   | <0.5    | 1.0  | 240  | 160  |     | 52  | 48  | 170 | 4.9 | 0   | 260  | 260   | 300   | 860  | 68 |
| CCC002                         | 08/25/86 | 1025 |       |             | 840  | 0.2            | <5  | 2   | 8   | <5  | <5  | <1  | <0.5    | 0.55 | 94   | 47   |     |     |     |     |     |     |      | 230   |       |      | 68 |
| CCC002                         | 10/25/86 | 0945 |       |             | 1500 | 0.3            | 6   | 6   | 1   | <5  | <5  | 1   | <0.5    | 1.6  | 230  | 290  |     |     |     |     |     |     |      | 360   |       |      | 58 |
| CCC002                         | 12/29/86 | 1100 | 7.4   |             | 1400 | 0.5            | <5  | <1  | <1  | <5  | <5  | <1  | <0.5    | 0.98 | 210  | 150  |     |     |     |     |     |     |      | 260   |       |      | 50 |
| CCC002                         | 04/08/87 | 1400 | 7.3   |             | 1750 | 1.4            |     |     |     |     |     |     |         | 1.4  | 340  |      |     |     |     |     |     |     |      |       |       |      | 70 |
| CCC002                         | 06/01/87 | 8.0  |       |             | 2870 |                |     |     |     |     |     |     |         | 2.3  | 417  | 450  |     |     |     |     |     |     |      |       |       |      | 75 |
| CCC002                         | 08/03/87 | 1535 | 7.6   |             | 1400 | 0.7            |     |     |     |     |     |     |         | 0.87 | 180  | 170  |     |     |     |     |     |     | 150  |       |       |      | 80 |
| Richardson Drain               |          |      |       |             |      |                |     |     |     |     |     |     |         |      |      |      |     |     |     |     |     |     |      |       |       |      |    |
| CCC003                         | 12/12/85 | 0840 | 8.2   |             | 1880 | 2              | <5  | 4.4 | 1.8 | 8.8 | 1.7 | 5.4 | <0.0002 | 2.9  | 270  | 260  |     |     |     |     |     |     |      |       |       |      | 63 |
| CCC003                         | 01/14/86 | 0845 | 7.9   |             | 1800 | 2              | 7   | 2   | 2   | 7   | <5  |     | <0.5    | 2.5  | 270  | 340  |     |     |     |     |     | 0   | 290  | 322   |       |      | 61 |
| CCC003                         | 02/24/86 | 1015 | 7.7   | 8.1         | 1910 | 2              | <5  | 6.7 | 3.2 | 6.9 | <5  | 15  | <0.2    | 2.4  | 280  | 280  |     | 83  | 64  | 2.5 | 1.7 | 0   | 270  | 270   | 490   | 1200 | 62 |
| CCC003                         | 03/17/86 | 1345 | 7.4   | 8.1         | 1900 | 2              | <5  | 1.8 | 3.4 | 13  | <5  | <1  | <0.0002 | 1.5  | 280  | 260  |     | 91  | 78  | 200 | 1.7 | 0   | 290  | 290   | 530   | 1100 |    |
| CCC003                         | 04/22/86 | 0930 | 7.3   | 8.0         | 2000 | 1.9            |     |     |     |     |     |     |         | 2.5  | 380  | 290  |     | 109 | 69  | 200 | 1.8 | 0   | 310  | 310   | 560   | 1300 | 62 |

Table 3. Water Quality Data for Sites Monitored in Contra Costa County (continued)

| Site Name                        | Date     | Time | field |          | pH  | EC  | Se  | Mo  | Cu  | Cr | ug/L |     |         |     | Hg  | B   | Cl  | SO4 | Ca  | Mg   | Na  | K   | CO3 | HCO3 | Total |      |    | TDS | Temp (F) |
|----------------------------------|----------|------|-------|----------|-----|-----|-----|-----|-----|----|------|-----|---------|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|------|-------|------|----|-----|----------|
|                                  |          |      | pH    | unhos/cm |     |     |     |     |     |    | Ni   | Pb  | Zn      |     |     |     |     |     |     |      |     |     |     |      |       |      |    |     |          |
| Stenzel Drain                    |          |      |       |          |     |     |     |     |     |    |      |     |         |     |     |     |     |     |     |      |     |     |     |      |       |      |    |     |          |
| CCC003                           | 06/13/86 | 0930 | 8.3   | 1900     |     |     |     |     |     |    |      |     |         |     | 2.5 | 260 | 260 | 51  | 62  | 190  | 1.8 | 0   | 300 | 300  | 360   | 1300 | 63 |     |          |
| CCC003                           | 06/23/86 | 0930 | 8.2   | 1800     | 1.6 | <5  | 1   | 2   | <5  | <5 | <5   | 3   | <0.5    | 2.6 | 210 | 180 | 46  | 62  | 190 | 1.6  | 0   | 270 | 270 | 350  | 1000  | 66   |    |     |          |
| CCC003                           | 08/25/86 | 0940 |       | 1800     | 1.7 | <5  | 3   | 8   | <5  | <5 | <5   | <1  | <0.5    | 2.7 | 230 | 210 |     |     |     |      |     |     |     | 270  | 68    |      |    |     |          |
| CCC003                           | 10/25/86 | 0855 |       | 1300     | 1.5 | <5  | 3   | 1   | <5  | <5 | <5   | <1  | <0.5    | 2.4 | 260 | 220 |     |     |     |      |     |     |     | 310  | 67    |      |    |     |          |
| CCC003                           | 12/29/86 | 1010 | 7.6   | 4000     | 3.4 | <5  | <1  | 2   | <5  | <5 | <5   | <1  | <0.5    | 2.6 | 260 | 250 |     |     |     |      |     |     |     | 180  | 64    |      |    |     |          |
| CCC003                           | 04/08/87 | 1330 | 7.4   | 2170     | 1.5 |     |     |     |     |    |      |     |         | 2.5 | 260 |     |     |     |     |      |     |     |     |      | 64    |      |    |     |          |
| CCC003                           | 06/01/87 |      | 7.9   | 2220     |     |     |     |     |     |    |      |     |         | 3.3 | 279 | 312 |     |     |     |      |     |     |     |      | 66    |      |    |     |          |
| CCC003                           | 08/03/87 | 1455 | 7.3   | 1900     | 1.6 |     |     |     |     |    |      |     |         | 2.7 | 220 | 220 |     |     |     |      |     |     |     | 290  | 67    |      |    |     |          |
| Stenzel Drain                    |          |      |       |          |     |     |     |     |     |    |      |     |         |     |     |     |     |     |     |      |     |     |     |      |       |      |    |     |          |
| CCC006                           | 12/12/85 | 1020 | 8.5   | 2100     | 1   | <5  | 4.2 | 2.8 | 11  | <5 | <5   | 7   | <0.0002 | 5.6 | 240 | 260 |     |     |     |      |     |     |     |      |       | 63   |    |     |          |
| CCC006                           | 01/14/86 | 0815 | 8.0   | 2000     | 1   | 6   | 2   | 2   | 10  | <5 | <5   |     | <0.5    | 5.5 | 230 | 340 |     |     |     |      |     | 0   | 390 | 398  |       | 60   |    |     |          |
| CCC006                           | 02/24/86 | 0945 | 7.8   | 1910     | 1   | 8.3 | 5.2 | 2.6 | 8.4 | <5 | <5   | 9.2 | <0.2    | 4.5 | 240 | 300 | 53  | 61  | 280 | 0.75 | 0   | 330 | 330 | 400  | 1200  | 61   |    |     |          |
| CCC006                           | 03/17/86 | 1415 | 7.4   | 2000     | 1   | 5   | 1.8 | 2.5 | 15  | <5 | <5   | 9.2 | <0.0002 | 4.7 | 240 | 250 | 74  | 68  | 262 | 0.87 | 0   | 360 | 360 | 430  | 1100  |      |    |     |          |
| CCC006                           | 04/22/86 | 0900 | 6.8   | 2000     | 2.1 |     |     |     |     |    |      |     |         | 4.5 | 260 | 340 | 86  | 64  | 284 | 0.88 | 0   | 370 | 370 | 380  | 1300  | 62   |    |     |          |
| CCC006                           | 06/13/86 | 0910 | 7.7   | 1900     |     |     |     |     |     |    |      |     |         | 4.5 | 240 | 270 | 31  | 55  | 240 | 0.86 | 0   | 330 | 330 | 300  | 1300  | 64   |    |     |          |
| CCC006                           | 06/23/86 | 0915 | 8.3   | 1800     | 2.3 | <5  | 1   | 2   | <5  | <5 | <5   | 1   | <0.5    | 3.7 | 250 | 80  | 39  | 58  | 210 | 1    | 0   | 370 | 370 | 320  | 1000  | 65   |    |     |          |
| CCC006                           | 08/25/86 | 0920 |       | 2100     | 1.1 | <5  | 2   | 8   | <5  | <5 | <5   | <1  | <0.5    | 5.6 | 250 | 280 |     |     |     |      |     |     |     | 408  | 68    |      |    |     |          |
| CCC006                           | 10/25/86 | 0830 |       | 1700     | 1.1 | <5  | 5   | 1   | <5  | <5 | <5   | 1   | <0.5    | 6.1 | 290 | 310 |     |     |     |      |     |     |     | 470  | 65    |      |    |     |          |
| CCC006                           | 12/29/86 | 0950 | 7.8   | 2200     | 1.5 | <5  | <1  | <1  | <5  | <5 | <5   | <1  | <0.5    | 6.6 | 250 | 310 |     |     |     |      |     |     |     | 430  | 63    |      |    |     |          |
| CCC006                           | 04/08/87 | 1315 | 6.8   | 1830     | 1   |     |     |     |     |    |      |     |         | 5.1 | 260 |     |     |     |     |      |     |     |     |      | 64    |      |    |     |          |
| CCC006                           | 06/01/87 |      | 7.8   | 2050     |     |     |     |     |     |    |      |     |         | 4.7 | 232 | 237 |     |     |     |      |     |     |     |      | 66    |      |    |     |          |
| CCC006                           | 08/03/87 | 1440 | 7.3   | 2200     | 1.2 |     |     |     |     |    |      |     |         | 6.1 | 200 | 240 |     |     |     |      |     |     |     | 420  | 68    |      |    |     |          |
| Marsh Creek Road Collector Drain |          |      |       |          |     |     |     |     |     |    |      |     |         |     |     |     |     |     |     |      |     |     |     |      |       |      |    |     |          |
| CCC007                           | 12/12/85 | 1135 | 7.8   | 1820     | 1   | <5  | 3.1 | 4.4 | 7.8 | <5 | <5   | 5.4 | <0.0002 | 3.1 | 230 | 150 |     |     |     |      |     |     |     |      |       | 66   |    |     |          |
| CCC007                           | 01/14/86 | 0800 | 7.0   | 1500     | 2   | <5  | <1  | 4   | <5  | <5 | <5   |     | <0.5    | 2.6 | 220 | 230 |     |     |     |      |     | 0   | 280 | 280  |       | 63   |    |     |          |
| CCC007                           | 02/24/86 | 0920 | 7.2   | 1590     | 2   | <5  | <1  | 5   | 12  | <5 | <5   | 12  | <0.2    | 2.7 | 250 | 160 | 69  | 47  | 197 | 0.9  | 0   | 280 | 280 | 360  | 960   | 63   |    |     |          |
| CCC007                           | 03/17/86 | 1425 | 7.3   | 1100     | 2   | <5  | 1.3 | 3.6 | 11  | <5 | <5   | <1  | 0.0014  | 3.2 | 250 | 200 | 83  | 51  | 198 | 0.88 | 0   | 330 | 330 | 400  | 940   |      |    |     |          |
| CCC007                           | 04/22/86 | 1140 | 7.4   | 1700     | 1.7 |     |     |     |     |    |      |     |         | 2.7 | 260 | 180 | 104 | 48  | 204 | 1.1  | 0   | 370 | 370 | 480  | 1100  | 65   |    |     |          |
| CCC007                           | 06/13/86 | 0825 | 8.1   | 1600     |     |     |     |     |     |    |      |     |         | 3.0 | 230 | 180 | 31  | 42  | 210 | 1    | 0   | 280 | 280 | 240  | 1100  | 64   |    |     |          |
| CCC007                           | 06/23/86 | 0825 | 8.1   | 1700     | 1.4 | <5  | <1  | 4   | <5  | <5 | <5   | 2   | <0.5    | 2.7 | 230 | 130 | 45  | 42  | 180 | 1.1  | 0   | 350 | 350 | 260  | 990   | 66   |    |     |          |
| CCC007                           | 08/25/86 | 0845 |       | 1700     | 1.7 | <5  | 2   | 8   | <5  | <5 | <5   | <1  | <0.5    | 3.0 | 240 | 160 |     |     |     |      |     |     |     | 360  | 66    |      |    |     |          |

Table 3. Water Quality Data for Sites Monitored in Contra Costa County (continued)

| Site Name                      | Date     | Time | pH   | EC   | Se  | Mo  | Cu  | Cr  | Ni  | Pb | Zn  | Hg      | B   | Cl  | SO4 | Ca | Mg | Na  | K    | CO3 | HCO3 | Total |       | TDS  | Temp<br>(F) |  |  |
|--------------------------------|----------|------|------|------|-----|-----|-----|-----|-----|----|-----|---------|-----|-----|-----|----|----|-----|------|-----|------|-------|-------|------|-------------|--|--|
|                                |          |      |      |      |     |     |     |     |     |    |     |         |     |     |     |    |    |     |      |     |      | Alk.  | Hard. |      |             |  |  |
| CCC007                         | 10/25/86 | 0745 |      | 1300 | 1.6 | <5  | 1   | 4   | <5  | <5 | <1  | <0.5    | 2.8 | 230 | 170 |    |    |     |      |     |      | 390   |       | 65   |             |  |  |
| CCC007                         | 12/29/86 | 0910 | 6.7  | 1700 | 1.8 | <5  | <1  | <1  | <5  | <5 | <1  | <0.5    | 3.2 | 230 | 150 |    |    |     |      |     |      | 380   |       | 66   |             |  |  |
| CCC007                         | 04/08/87 | 1240 | 6.6  | 2680 | 1.5 |     |     |     |     |    |     |         | 3.0 | 240 |     |    |    |     |      |     |      |       |       | 66   |             |  |  |
| CCC007                         | 06/01/87 | 7.1  | 1720 |      |     |     |     |     |     |    |     |         | 2.9 | 219 | 146 |    |    |     |      |     |      |       |       | 67   |             |  |  |
| CCC007                         | 08/03/87 | 1400 | 6.5  | 1600 | 1.9 |     |     |     |     |    |     |         | 2.9 | 180 | 150 |    |    |     |      |     |      | 270   |       | 67   |             |  |  |
| Mikelson / Coelho Drain        |          |      |      |      |     |     |     |     |     |    |     |         |     |     |     |    |    |     |      |     |      |       |       |      |             |  |  |
| CCC008                         | 12/12/85 | 1050 | 7.8  | 1710 | 2   | 6.4 | 3.1 | 3.1 | 4.9 | <5 | 8.5 | <0.0002 | 3.5 | 210 | 160 |    |    |     |      |     | 0    | 350   | 358   |      | 64          |  |  |
| CCC008                         | 01/14/86 | 1000 | 7.2  | 1600 | 2   | 9   | 3   | 3   | <5  | <5 |     | 0.82    | 3.4 | 200 | 250 |    |    |     |      |     |      |       |       | 59   |             |  |  |
| CCC008                         | 02/24/86 | 0930 | 7.6  | 1640 | 2   | 6.3 | 1.5 | 19  | 14  | <5 | <1  | <0.2    | 3.3 | 220 | 210 | 51 | 62 | 219 | 0.72 | 0   | 360  | 360   | 380   | 1000 | 62          |  |  |
| CCC008                         | 03/27/86 | 1040 | 7.2  | 1700 | 3   | <5  | <1  | 11  | <5  | <5 | 6   | <0.5    |     | 210 | 180 | 48 | 67 | 214 | 0.59 | 0   | 340  | 340   | 370   | 1000 | 64          |  |  |
| CCC008                         | 04/22/86 | 1130 | 7.5  | 1700 | 2.6 |     |     |     |     |    |     |         | 2.8 | 250 | 200 | 79 | 66 | 216 | 0.68 | 0   | 390  | 390   | 420   | 1100 | 64          |  |  |
| CCC008                         | 06/13/86 | 0850 | 8.2  | 1600 |     |     |     |     |     |    |     |         | 3.1 | 200 | 170 | 26 | 56 | 190 | 0.69 | 0   | 270  | 270   | 300   | 1000 | 64          |  |  |
| CCC008                         | 06/23/86 | 0850 | 8.2  | 1600 | 2.8 | <5  | 1   | 3   | <5  | <5 | 3   | <0.5    | 3.1 | 220 | 200 | 30 | 57 | 200 | 0.66 | 0   | 360  | 360   | 300   | 1000 | 66          |  |  |
| CCC008                         | 08/25/86 | 0910 |      | 1800 | 2.1 | <5  | 2   | 9   | <5  | <5 | <1  | <0.5    | 3.4 | 220 | 170 |    |    |     |      |     |      | 412   |       | 68   |             |  |  |
| CCC008                         | 10/25/86 | 0810 |      | 1400 | 2.1 | <5  | 2   | 3   | <5  | <5 | <1  | <0.5    | 3.5 | 210 | 200 |    |    |     |      |     |      | 420   |       | 65   |             |  |  |
| CCC008                         | 12/29/86 | 0930 | 7.0  | 1800 | 2.2 | <5  | <1  | <1  | <5  | <5 | <1  | <0.5    | 3.8 | 210 | 150 |    |    |     |      |     |      | 420   |       | 63   |             |  |  |
| CCC008                         | 04/08/87 | 1300 | 6.5  | 1700 | 1.9 |     |     |     |     |    |     |         | 3.5 | 210 |     |    |    |     |      |     |      |       |       | 65   |             |  |  |
| CCC008                         | 06/01/87 | 7.5  | 1810 |      |     |     |     |     |     |    |     |         | 3.7 | 200 | 161 |    |    |     |      |     |      |       |       | 66   |             |  |  |
| CCC008                         | 08/03/87 | 1415 | 6.9  | 1900 | 1.9 |     |     |     |     |    |     |         | 4.4 | 180 | 170 |    |    |     |      |     |      | 400   |       | 67   |             |  |  |
| Collector Line 4-N / 5-N Drain |          |      |      |      |     |     |     |     |     |    |     |         |     |     |     |    |    |     |      |     |      |       |       |      |             |  |  |
| CCC009                         | 12/12/85 | 1215 | 8.0  | 1520 | 1   | <5  | 2.5 | 4.4 | 6.4 | <5 | 14  | <0.0002 | 2.7 | 180 | 130 |    |    |     |      |     | 0    | 330   | 330   |      | 63          |  |  |
| CCC009                         | 01/14/86 | 1030 | 7.3  | 1400 | 1   | <5  | 2   | 4   | <5  | <5 |     | <0.5    | 2.6 | 180 | 210 |    |    |     |      |     |      |       |       | 59   |             |  |  |
| CCC009                         | 02/24/86 | 0850 | 7.3  | 1850 | 1   | <5  | 2   | 3.7 | 10  | <5 | 7.4 | <0.2    | 2.2 | 170 | 130 | 42 | 51 | 150 | 0.4  | 0   | 290  | 290   | 350   | 1100 | 61          |  |  |
| CCC009                         | 03/27/86 | 0930 | 6.9  | 1300 | 1   | <5  | 3   | 9   | <5  | <5 | <5  | <0.5    | 1.7 | 160 | 130 | 54 | 62 | 150 | 0.44 | 0   | 300  | 300   | 380   | 890  | 63          |  |  |
| CCC009                         | 04/22/86 | 1210 | 7.4  | 1400 | 1   |     |     |     |     |    |     |         | 2.1 | 180 | 160 | 74 | 59 | 161 | 0.47 | 0   | 360  | 360   | 480   | 870  | 64          |  |  |
| CCC009                         | 06/13/86 | 1050 | 8.0  | 1400 |     |     |     |     |     |    |     |         | 2.3 | 160 | 130 | 28 | 53 | 140 | 0.48 | 0   | 310  | 310   | 260   | 830  | 64          |  |  |
| CCC009                         | 06/23/86 | 1100 | 8.2  | 1300 | 1   | <5  | 1   | 2   | <5  | <5 | 2   | <0.5    | 2.3 | 160 | 140 | 29 | 51 | 140 | 0.52 | 0   | 340  | 340   | 270   | 820  | 66          |  |  |
| CCC009                         | 10/25/86 | 1020 |      | 1100 | 1.2 | <5  | <1  | 4   | <5  | <5 | <1  | <0.5    | 2.4 | 180 | 130 |    |    |     |      |     |      | 360   |       | 66   |             |  |  |
| CCC009                         | 12/29/86 | 1135 | 7.3  | 1500 | 1.2 | <5  | <1  | <1  | <5  | <5 | <1  | <0.5    | 2.8 | 180 | 120 |    |    |     |      |     |      | 400   |       | 64   |             |  |  |
| CCC009                         | 04/08/87 | 1430 | 7.2  | 2210 | 1   |     |     |     |     |    |     |         | 2.5 | 170 |     |    |    |     |      |     |      |       |       | 66   |             |  |  |
| CCC009                         | 06/01/87 | 7.7  | 1440 |      |     |     |     |     |     |    |     |         | 2.8 | 147 | 111 |    |    |     |      |     |      |       |       | 66   |             |  |  |

Table 3. Water Quality Data for Sites Monitored in Contra Costa County (continued)

| Site Name                      | Date     | Time | field |     | pH   | EC<br>umhos/cm | Se | Mo | Cu  | Cr  | Ni | Pb  | Zn   | Hg  | B    | Cl  | SO4 | Ca  | Mg   | Na   | K | CO3 | HCO3 | Alk. | Hard. | TDS  | Temp<br>(F) |
|--------------------------------|----------|------|-------|-----|------|----------------|----|----|-----|-----|----|-----|------|-----|------|-----|-----|-----|------|------|---|-----|------|------|-------|------|-------------|
|                                |          |      |       |     |      |                |    |    |     |     |    |     |      |     |      |     |     |     |      |      |   |     |      |      |       |      |             |
| Collector N-6 Drain            |          |      |       |     |      |                |    |    |     |     |    |     |      |     |      |     |     |     |      |      |   |     |      |      |       |      |             |
| CCC010                         | 02/24/86 | 0810 | 6.7   | 8.2 | 1910 | 1              | <5 | <1 | 3.3 | 9.8 | <5 | 8.6 | <0.2 | 1.1 | 160  | 130 | 47  | 48  | 208  | 0.37 | 0 | 330 | 330  | 330  | 330   | 1100 | 61          |
| CCC010                         | 03/27/86 | 0950 | 7.2   | 8.3 | 1300 | 1              | <5 | 2  | 1   | <5  | <5 | <5  | <0.5 | 2.5 | 160  | 130 | 50  | 57  | 165  | 0.35 | 0 | 340 | 340  | 340  | 340   | 800  | 63          |
| CCC010                         | 04/22/86 | 1230 | 7.5   | 7.6 | 1500 | 1.3            |    |    |     |     |    |     |      | 2.3 | 180  | 140 | 64  | 50  | 172  | 0.4  | 0 | 370 | 370  | 440  | 890   | 63   |             |
| CCC010                         | 06/13/86 | 1110 | 8.2   |     | 1300 |                |    |    |     |     |    |     |      | 2.6 | 150  | 130 | 23  | 56  | 160  | 0.44 | 0 | 320 | 320  | 250  | 850   | 64   |             |
| CCC010                         | 06/23/86 | 1130 | 8.3   |     | 1200 | 0.4            | <5 | <1 | 3   | <5  | <5 | 2   | <0.5 | 2.6 | 160  | 130 | 22  | 45  | 150  | 0.43 | 0 | 300 | 300  | 230  | 760   | 66   |             |
| CCC010                         | 08/25/86 | 1120 |       |     | 1400 | 0.4            | <5 | 3  | 7   | <5  | <5 | <1  | <0.5 | 2.8 | 160  | 120 |     |     |      |      |   | 360 |      |      |       | 70   |             |
| CCC010                         | 10/25/86 | 1105 |       |     | 1100 | 0.6            | <5 | 2  | 2   | <5  | <5 | <1  | <0.5 | 3.5 | 180  | 130 |     |     |      |      |   | 410 |      |      |       | 66   |             |
| CCC010                         | 12/29/86 | 1205 | 7.6   |     | 1600 | 0.8            | <5 | <1 | <1  | <5  | <5 | <1  | <0.5 | 3.3 | 170  | 120 |     |     |      |      |   | 460 |      |      |       | 64   |             |
| CCC010                         | 06/01/87 | 7.7  |       |     | 1440 |                |    |    |     |     |    |     |      | 2.4 | 138  | 113 |     |     |      |      |   |     |      |      |       | 66   |             |
| CCC010                         | 08/03/87 | 1625 | 6.6   |     | 1400 | 0.4            |    |    |     |     |    |     |      | 2.6 | 130  | 110 |     |     |      |      |   | 360 |      |      |       | 68   |             |
| Fisk Creek Collector 7-N Drain |          |      |       |     |      |                |    |    |     |     |    |     |      |     |      |     |     |     |      |      |   |     |      |      |       |      |             |
| CCC011                         | 04/22/86 | 1445 | 6.6   | 7.5 | 2300 | 1.9            |    |    |     |     |    |     |      | 6.5 | 413  | 300 | 96  | 51  | 358  | 2.2  | 0 | 370 | 370  | 460  | 1600  | 64   |             |
| CCC011                         | 06/13/86 | 1130 | 7.9   |     | 1800 |                |    |    |     |     |    |     |      | 4.7 | 240  | 190 | 32  | 43  | 260  | 1.9  | 0 | 370 | 370  | 250  | 1200  | 64   |             |
| CCC011                         | 06/23/86 | 1150 | 8.0   |     | 1800 | 1.4            | <5 | <1 | 3   | <5  | <5 | 1   | <0.5 | 4.5 | 260  | 180 | 17  | 42  | 230  | 1.8  | 0 | 300 | 300  | 240  | 1100  | 66   |             |
| CCC011                         | 08/25/86 | 1135 |       |     | 2600 | 1.6            | <5 | 3  | 7   | <5  | <5 | 3   | <0.5 | 8.4 | 400  | 310 |     |     |      |      |   | 360 |      |      |       | 70   |             |
| CCC011                         | 10/25/86 | 1135 |       |     | 3000 | 2.6            | <5 | 5  | 5   | <5  | <5 | <1  | <0.5 | 15  | 810  | 540 |     |     |      |      |   | 470 |      |      |       | 66   |             |
| CCC011                         | 12/29/86 | 1230 | 8.0   |     | 4000 | 2.7            | <5 | <1 | <1  | <5  | <5 | <1  | <0.5 | 15  | 310  | 280 |     |     |      |      |   | 460 |      |      |       | 63   |             |
| CCC011                         | 04/08/87 | 1530 | 6.8   |     | 4360 | 2.4            |    |    |     |     |    |     |      | 16  | 780  |     |     |     |      |      |   |     |      |      |       | 64   |             |
| CCC011                         | 06/01/87 | 7.6  |       |     | 2490 |                |    |    |     |     |    |     |      | 6.8 | 303  | 250 |     |     |      |      |   |     |      |      |       | 66   |             |
| CCC011                         | 08/03/87 | 1645 | 6.8   |     | 3000 | 1.9            |    |    |     |     |    |     |      | 5.3 | 340  | 340 |     |     |      |      |   | 400 |      |      |       | 68   |             |
| Delta Mendota Discharge        |          |      |       |     |      |                |    |    |     |     |    |     |      |     |      |     |     |     |      |      |   |     |      |      |       |      |             |
| CCC012                         | 06/23/86 | 1310 | 8.4   |     | 2100 | 1.4            | <5 | 1  | 7   | <5  | <5 | 3   | <0.5 | 4.6 | 290  | 180 | 17  | 34  | 300  | 0.93 | 0 | 360 | 360  | 180  | 1200  |      |             |
| CCC012                         | 08/25/86 | 1215 |       |     | 1300 | 0.7            | <5 | 4  | 8   | 6   | <5 | 7   | <0.5 | 2.7 | 190  | 100 |     |     |      |      |   | 230 |      |      |       | 70   |             |
| Sheldon Moore Main Drain Sump  |          |      |       |     |      |                |    |    |     |     |    |     |      |     |      |     |     |     |      |      |   |     |      |      |       |      |             |
| CCC013                         | 03/27/86 | 1320 | 6.9   | 8.1 | 6800 | 4              | 21 | 52 | 4   | 68  | 19 | 14  | <0.5 | 11  | 1700 | 960 | 176 | 180 | 1050 | 1.6  | 0 | 300 | 300  | 1140 | 4500  | 62   |             |
| CCC013                         | 04/22/86 | 1300 | 6.8   | 7.7 | 6500 | 2.9            |    |    |     |     |    |     |      | 14  | 2000 | 620 | 155 | 145 | 1040 | 2.4  | 0 | 360 | 360  | 1100 | 4000  | 62   |             |
| CCC013                         | 06/13/86 | 1210 | 8.0   |     | 2200 |                |    |    |     |     |    |     |      | 4   | 430  | 250 | 63  | 47  | 340  | 2.4  | 0 | 130 | 130  | 380  | 1500  | 66   |             |

Table 3. Water Quality Data for Sites Monitored in Contra Costa County (continued)

| Site Name                     | Date     | Time | pH  | pH    | EC       | Se  | Mo | Cu | Cr | Ni   | Pb | Zn | Hg   | B   | Cl  | SO4 | Ca  | Mg  | Na   | K   | CO3 | HCO3 | Total |       | TDS  | Temp (F) |  |
|-------------------------------|----------|------|-----|-------|----------|-----|----|----|----|------|----|----|------|-----|-----|-----|-----|-----|------|-----|-----|------|-------|-------|------|----------|--|
|                               |          |      |     |       |          |     |    |    |    |      |    |    |      |     |     |     |     |     |      |     |     |      | Alk.  | Hard. |      |          |  |
|                               |          |      |     | field | umhos/cm |     |    |    |    | ug/L |    |    |      |     |     |     |     |     | mg/L |     |     |      |       |       |      |          |  |
| Sheldon Moore East Drain Sump |          |      |     |       |          |     |    |    |    |      |    |    |      |     |     |     |     |     |      |     |     |      |       |       |      |          |  |
| CCC014                        | 03/27/86 | 1345 | 6.6 | 8.0   | 3000     | 1   | 12 | 8  | <1 | 21   | 5  | 18 | <0.5 | 2.9 | 640 | 390 | 143 | 94  | 329  | 2.3 | 0   | 200  | 200   | 750   | 1800 | 64       |  |
| CCC014                        | 04/22/86 | 1330 | 7.0 | 7.3   | 1600     | 0.6 |    |    |    |      |    |    | 1.7  | 310 | 240 | 75  | 47  | 218 | 1.5  | 0   | 220 | 220  | 420   | 1100  | 62   |          |  |
| CCC014                        | 06/13/86 | 1230 | 8.3 | 780   |          |     |    |    |    |      |    |    | 0.62 | 87  | 110 | 37  | 17  | 86  | 2.7  | 0   | 80  | 80   | 190   | 500   | 70   |          |  |

APPENDIX A  
Discharge Sites Monitored  
for Water Quality

## MONITORING SITE INFORMATION

**SITE ID #** CCC 001

**Site Name:** Tule Lane Collector Drain

**Site description, location and access:** Collector drain sump located at the east end of Tule Lane, approximately 1.1 miles east of Knightsen Avenue. Discharge pipe is located in the beginning of Rock Slough.

**Township/Range/Section:** NE 1/4, NW 1/4, SE 1/4, Sec. 33, T.2N, R.3E  
(DWR# 2N/3E-33K)

**Latitude/Longitude:** Lat. 37° 58' 33"/Long. 121° 38' 45"

**County:** Contra Costa

**USGS Quad Map:** Brentwood, CA

### WATER SOURCE

**Type and source of water being monitored (description):** All the water being discharged from this sump is tile drainage water.

---

## MONITORING SITE INFORMATION

**SITE ID #** CCC 002

**Site Name:** Main Drain Pump at Veale Tract

**Site description, location and access:** The main drain pump is located 1 mile east of the Delta Road crossing of Rock Slough. Access is via the southern levee of Rock Slough.

**Township/Range/Section:** NW 1/4, NE 1/4, SW 1/4, Sec. 36, T.2N, R.3E  
(DWR# 2N/3E-36L)

**Latitude/Longitude:** Lat. 37° 58' 32"/Long. 121° 36' 12"

**County:** Contra Costa

**USGS Quad Map:** Woodward Island

### WATER SOURCE

**Type and source of water being monitored (description):** This pump discharges drain water and irrigation return flows from the open drainage system within Veale Tract.

**Comments on factors affecting water quality and quantity at the site:** Sample results will depend upon the amount of tailwater entering the drainage system.

## MONITORING SITE INFORMATION

**SITE ID #** CCC 003

**Site Name:** Sunset Road Collector Drain (Richardson Drain Outlet)

**Site description, location and access:** Collector drain sump located at the western end of an unnamed slough. The sump is 0.8 miles east of Byron Highway and 1.0 miles south of Delta Road. Access is off Bryon Highway at the Sunset Road intersection.

**Township/Range/Section:** NW 1/4, NE 1/4, NE 1/4, Sec. 10, T.1N, R.3E  
(DWR# 1N/3E-10A)

**Latitude/Longitude:** Lat. 37° 57' 16"/Long. 121° 27' 30"

**County:** Contra Costa

**USGS Quad Map:** Woodward Island

### WATER SOURCE

**Type and source of water being monitored (description):** All the drainage water discharging from this sump is subsurface tile drainage water collected from irrigated land within the East Contra Costa Irrigation District.

**Comments on factors affecting water quality and quantity at the site:** Water quality will depend upon ground water quality.

---

## MONITORING SITE INFORMATION

**SITE ID #** CCC 006

**Site Name:** Main Pumping Plant Drain Sump (Stenzel Drain Outlet)

**Site description, location and access:** Collector drain discharge point located on the west side of Bixler Road immediately north of the East Contra Costa Irrigation District main pump house at Indian Slough (0.5 miles south of Balfour Road).

**Township/Range/Section:** SE 1/4, SE 1/4, NE 1/4, Sec. 22, T.1N, R.3E  
(DWR# 1N/3E-22H)

**Latitude/Longitude:** Lat. 37° 55' 05"/Long. 121° 37' 19"

**County:** Contra Costa

**USGS Quad Map:** Woodward Island

### WATER SOURCE

**Type and source of water being monitored (description):** All of the water entering the collection sump is tile drainage water. The discharge from the sump is into the main pumping lift for the East Contra Costa Irrigation District.



## MONITORING SITE INFORMATION

**SITE ID #** CCC 007

**Site Name:** Marsh Creek Road Collector Drain

**Site description, location and access:** Collector drain discharge located in the southwest corner of the intersection of Marsh Creek Road and Bixler Road (0.5 miles north of State Highway 4).

**Township/Range/Section:** NE 1/4, NE 1/4, NE 1/4, Sec. 34, T.1N, R.3E  
(DWR# 1N/3E-34A)

**Latitude/Longitude:** Lat. 37° 53' 47"/Long. 121° 37' 20"

**County:** Contra Costa

**USGS Quad Map:** Woodward Island

### WATER SOURCE

**Type and source of water being monitored (description):** All water in this drain is tile drainage water.

**Comments on factors affecting water quality and quantity at the site:** Care must be taken to ensure that the sample is taken from the tile drain line as the line is often submerged because of tailwater flowing in a drain entering at the same point.

---

## MONITORING SITE INFORMATION

**SITE ID #** CCC 008

**Site Name:** Mikelson/Coelho Drain

**Site description, location and access:** Collector drain discharge flowing in an open drain as it undercrosses Bixler Road, 0.3 miles north of Marsh Creek Road. The actual discharge point from the buried collector drain is located near the midpoint of Section 27. The best and most representative sampling point is in a manhole at the midpoint of Section 27 (1/2 mile east of Bixler Road and 1/2 mile north of Marsh Creek Road). The manhole is located on the west side of the open drain.

**Township/Range/Section:** SE 1/4, NE 1/4, SE 1/4, Sec. 27, T.1N, R.3E  
(DWR# 1N/3E-27J)

**Latitude/Longitude:** Lat. 37° 54' 05"/Long. 121° 37' 20"

**County:** Contra Costa

**USGS Quad Map:** Brentwood

### WATER SOURCE

**Type and source of water being monitored (description):** The water discharging from the collector drain (buried) is all tile drainage water. The water in the open drain is often a combination of tile drainage water and surface tailwater from irrigated land upslope.

**Comments on factors affecting water quality and quantity at the site:** The water quality will reflect the amount of tailwater entering the system. Samples taken from the manhole will contain all tile drainage water.

## MONITORING SITE INFORMATION

**SITE ID #** CCC 009

**Site Name:** Collector Drains 4-N & 5-N

**Site description, location and access:** The outfall is on the west bank of a canal below a weir and foot bridge. From Bixler Road take Kellogg Creek Road east. The canal is apparent due to trees and brush. Park near the mobile home. Walk north along the edge of a field less than 1/4 mile long.

**Township/Range/Section:** NW 1/4, SW 1/4, SE 1/4, Sec. 34, T.1N, R.3E  
(DWR# 1N/3E-34Q)

**Latitude/Longitude:** Lat. 37° 53' 04"/Long. 121° 37' 45"

**County:** Contra Costa

**USGS Quad Map:** Brentwood, CA

### WATER SOURCE

**Type and source of water being monitored (description):** All the water at the outfall is tile drainage. This outfall is a combination of water from tile drains N-4 & N-5.

**Comments on factors affecting water quality and quantity at the site:** If the level of surface water is high in the canal, it may be difficult to take samples of drainage water without contamination.

---

## MONITORING SITE INFORMATION

**SITE ID #** CCC 010

**Site Name:** Collector Drain 6-N

**Site description, location and access:** Collector Drain 6-N at a manhole 0.25 miles east of Byron Highway and 0.15 miles south of Byers Road. Manhole is located at the east end of a row of trees. Access is via a dirt road on the east side of a large barn 0.3 miles east of Byron Highway on Byers Road.

**Township/Range/Section:** SE 1/4, NW 1/4, SW 1/4, Sec. 3, T.1S, R.3E  
(DWR# 1S/3E-3M)

**Latitude/Longitude:** Lat. 37° 52' 21"/Long. 121° 38' 09"

**County:** Contra Costa

**USGS Quad Map:** Byron Hot Springs, CA

### WATER SOURCE

**Type and source of water being monitored (description):** All the water coming from this site is tile drainage water.

## MONITORING SITE INFORMATION

**SITE ID #** CCC 011

**Site Name:** Collector Drain 7-N (Fisk Ck. Drain)

**Site description, location and access:** To access this site, take Byron Highway to Camino Diablo. Proceed east on Camino Diablo for approximately 0.65 miles to the second of two gates on the south side of the road. A good landmark for the gates is the two large Eucalyptus trees on the south side of the road. The second gate is approximately 100 yards east of the trees. Go through the gate and drive to the southeast corner of the farm. The sampling site is a manhole at this corner.

**Township/Range/Section:** NW 1/4, SE 1/4, NE 1/4, Sec. 10, T.1S, R.3E

**Latitude/Longitude:** Lat. 37° 51' 46"/Long. 121° 37' 30"

**County:** Contra Costa

**USGS Quad Map:** Byron Hot Springs, CA

### WATER SOURCE

**Type and source of water being monitored (description):** All the water from this site is tile drainage water.

---

## MONITORING SITE INFORMATION

**SITE ID #** CCC 012

**Site Name:** Delta Mendota Discharge Collector Line 1-S

**Site description, location and access:** This is a buried collector line that begins near the old Highway 50 and Patterson Pass Road. The flow is down Patterson Pass Road then turns north and flows on the west side of the Byron-Tracy Highway. The discharge occurs into the Delta-Mendota Canal near the intersection of the Byron-Tracy Highway and Mountain House Road. Access is through a clean-out structure adjacent to the Delta-Mendota Canal levee.

**Township/Range/Section:** NE 1/4, SE 1/4, SW 1/4, Sec. 6, T.1S, R.4E  
(DWR# 1S/4E-6P)

**Latitude/Longitude:** Lat. 37° 48' 45"/Long. 121° 34' 40"

**County:** Contra Costa

**USGS Quad Map:** Clifton Court Forebay

### WATER SOURCE

**Type and source of water being monitored (description):** Subsurface drainage water only from the southern portion of the Byron-Bethany Irrigation District.

## MONITORING SITE INFORMATION

**SITE ID #** CCC 013

**Site Name:** Sheldon Moore Main Drain Sump

**Site description, location and access:** This farm tile drainage sump is located on the north side of the farm approximately 1/4 mile west of the powerlines. Access can be gained through the farm from the east or by the Clifton Court Forebay levee road.

**Township/Range/Section:** NW 1/4, SW 1/4, SW 1/4, Sec. 20, T.1S, R.4E  
(DWR # 1S/4E-20N)

**Latitude/Longitude:** Lat. 37° 49' 36"/Long. 121° 34' 02"

**County:** Contra Costa

**USGS Quad Map:** Clifton Court Forebay, CA

### WATER SOURCE

**Type and source of water being monitored (description):** Farm tile drainage.

---

## MONITORING SITE INFORMATION

**SITE ID #** CCC 014

**Site Name:** Sheldon Moore East Drain Sump

**Site description, location and access:** This farm tile drain sump is located approximately 1/2 mile north of the ranch headquarters near the south east corner of a farm labor housing compound. Access is through the farm headquarters, either by levee or farm roads.

**Township/Range/Section:** NW 1/4, SE 1/4, SE 1/4, Sec. 20, T.1S, R.4E  
(DWR# 1S/4E-20R)

**Latitude/Longitude:** Lat. 37° 49' 38"/Long. 121° 33' 08"

**County:** Contra Costa

**USGS Quad Map:** Clifton Court Forebay

### WATER SOURCE

**Type and source of water being monitored (description):** Farm tile drainage.

